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PARSONS ENGINEERING SCIENCE, INC.

10521 Rosehaven Street • Fairfax, Virginia 22030 • (703) 591-7575 • Fax: (703) 591-1305

November 11, 1994

Mr. Garth Connor
EPA Project Manager (3HW23)
U.S. Environmental Protection Agency
841 Chestnut Street
Philadelphia, PA 19107

Re: Request for Scheduling of a Technical Presentation on Capping and
Solidification/Stabilization at the USEPA Region III Office,
Tuesday, December 13, 1994

Dear Garth:

Parsons Engineering Science, Inc. (Parsons ES) is interested in providing a technical presentation on the use of containment remedies [i.e. capping and solidification/stabilization (S/S) technologies] at Superfund sites. I believe that this presentation will be an extremely valuable tool for yourself and other Region III technical staff involved with site remediation activities.

As part of the presentation, Parsons ES has invited two independent experts in the field of capping and S/S to share their knowledge with the group. Dr. David Daniel, University of Texas, is an expert in capping issues. Dr. Daniel has made presentations to all ten USEPA regional offices on the use of capping at hazardous waste sites. Dr. Paul Bishop, University of Cincinnati, is an expert on S/S, has been a technical reviewer of USEPA published reports on S/S of Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) waste, and has recently co-authored a book on innovative site remediation technologies using S/S. Biographies of both experts are included as Attachment 1.

As you are aware, the scheduling of these two experts to attend and make presentations at the same time was a difficult task. To successfully initiate this process, I am requesting an appointment to present this technology information for **Tuesday, December 13, 1994, from 9:00 to approximately 11:30 a.m. in the USEPA Region III offices.** I have attached a draft agenda (Attachment 2) of the proposed presentation. The presentation will be entirely technical in nature and will be completely generic. The intent of the presentation is to give you and other USEPA staff an opportunity to learn of some of the new innovations in the field of cover systems and S/S technologies. Site specific remedy selection will not be a part of this presentation.

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I believe that the technical presentation will provide an excellent forum for learning and discussing these types of technology applications. A good portion of our discussion will relate to the use of these technologies and how they achieve protection of human health and the environment. Thus, we would encourage USEPA risk assessment and BTAG staff to attend. Please review the enclosed materials and contact me at (804) 460-4453 with your questions and concerns. We will need to finalize the date and time as soon as possible.

Sincerely,

PARSONS ENGINEERING-SCIENCE, INC.

Susan K. Fullerton /alt

Susan K. Fullerton, P.E.
Project Manager

JS:jt

Enclosures

cc: Dave Babcock, Parsons ES-Syracuse
John Segna, Parsons ES-Fairfax
Amy Tarleton, Parsons ES-Fairfax

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ATTACHMENT 1
BIOGRAPHIES

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PAUL L. BISHOP

EDUCATION:

<u>Degree</u>	<u>Field</u>	<u>Institution</u>	<u>Date</u>
B.S.C.E.	Civil Engineering	Northeastern University	1968
M.S.C.E.	Environmental Engineering	Purdue University	1970
Ph.D.	Environmental Engineering	Purdue University	1972

UNIVERSITY EXPERIENCE:

<u>Rank</u>	<u>University</u>	<u>Dates</u>
Professor of Environmental Engineering; University Coordinator for Interdisciplinary Environmental Research and Education	University of Cincinnati	1993 - Present
William Thoms Professor and Head of Civil and Environmental Engineering	University of Cincinnati	1987 - 1993
Professor	University of New Hampshire	1982 - 1987
Guest Professor	Technical University of Denmark Lyngby, Denmark	1986 - 1987
Visiting Professor	Cornell University	1981, 1982, 1985 (Summers)
Associate Professor	University of New Hampshire	1976 - 1982
Associate Professor and Chairman	University of New Hampshire	1977 - 1980
Visiting Professor	Heriot-Watt University Edinburgh, Scotland	1980
Assistant Professor	University of New Hampshire	1972 - 1976

PROFESSIONAL EXPERIENCE:

<u>Position Title</u>	<u>Company</u>	<u>Dates</u>
Environmental Engineering Consultant		1972 - Present

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County Sanitarian	Tippecanoe County Health Dept. Lafayette, Indiana	1971 - 1972
Environmental Engineer	Metcalf & Eddy Engineers, Inc. Boston, Massachusetts	1968
Cooperative Engineer	Metcalf & Eddy Engineers, Inc. Boston, Massachusetts	1964 - 1967

REPRESENTATIVE CONSULTING EXPERIENCE:

<u>Description</u>	<u>Dates</u>
Tannery wastewater treatment, Suncook Leathers, Inc., Pittsfield, NH	1972 - 1987
Hydrologic studies, Sherburne Village, Merrimack, NH	1972 - 1973
Design of sanitary landfill, Moultonboro, NH	1973
Hydrologic studies, Colonial Chateau of Exeter, NH	1973
Design of a metal plating waste treatment system, Janco Sales, Inc., Barrington, NH	1974 - 1976
Tannery wastewater treatment, United Tanners of Dover, Dover, NH	1975 - 1976
Consultation on waste treatment, Simplex Wire and Cable Co., Inc., Portsmouth, NH	1976 - 1981
Studies on groundwater pollution, Bartlett, NH	1976
Pollution from silage operations, Amherst, NH	1976
Design of water treatment system, Fiber Process Division, Lydall, Inc., Rochester, NH	1976 - 1977
Design of a sanitary landfill, Newmarket, NH	1977
Consultation on laundry waste treatment, Dover, NH	1977
Evaluation of activated sludge aeration equipment, Wolfeboro, NH	1977
Design of waste treatment facilities for a diatomaceous earth mining and processing plant, Lake Umbagog, NH	1977
Design of a waste treatment facility for lithographic wastes, Concord Litho Co., Concord, NH	1978
Evaluation of possible utilization of pulp mill sludges, Garden State Paper Co., Inc. Garfield, NJ	1978

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Evaluation of waste treatment facilities for metal plating wastes, Franklin Electroplating, Dover, NH	1980 - 1982
Evaluation of waste treatment facilities for metal plating wastes, New England Circuits Merrimack, NH	1980 - 1982
Evaluation of the Stablex hazardous waste solidification process, Hooksett, NH	1980 - 1981
Design of a tannery sludge landfill, Suncook Leathers, Inc., Pittsfield, NH	1981 - 1982
Evaluation of paint sludges as a hazardous waste, Donnelly Manufacturing Co., Inc., Exeter, NH	1982 - 1983
Design of metal plating waste recovery system, Jewell Electrical Instruments, Inc., Manchester, NH	1983
Design of a metal plating waste treatment system, Green Mountain Metal Finishers, Bradford, Vermont	1983
Regional solid waste management plan, Tri-County Solid Waste Management District, Manchester, NH	1984 - 1985
Hazardous waste study, Davidson Rubber Division, Farmington, NH	1984
Waste management study, Coastal GFRC, Inc., Hooksett, NH	1985
Expert witness, A.C. Lawrence Leather Co., Inc., South Paris, ME	1985
Design of a metal plating waste treatment system, Enterprise Systems Corp., Dover, NH	1985
Design of a land application wastewater treatment system, Seacoast Engineering Associates, Inc., Stratham, NH	1986
Review of Soliditech, Inc. solidification/stabilization process, PRC Environmental Management, Inc., Chicago, IL	1988 - 1989
Technical Advisory Board, Warzyn Engineering, Inc., Madison, WI	1991 - Present
Solidification/stabilization engineering bulletin, SAIC, McLean, VA	1991
Stabilization with soluble phosphates, Wheelabrator Environmental Systems, Hampton, NH	1992 - 1993
Solidification/stabilization consulting, Chemical Waste Management, Geneva, IL	1992
Solidification/stabilization consulting, Warzyn, Inc., Madison, WI	1994

PROFESSIONAL REGISTRATION:

Registered Professional Engineer in the State of New Hampshire.

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PROFESSIONAL ORGANIZATIONS:

American Academy of Environmental Engineers
 Member of Board of Trustees, 1988 - 1991
 Seminars Committee - Chair, 1988 - 1989
 Education Committee - Chair, 1989 - present

Water Environment Federation (formerly WPCF)
 Sludge Management Program Subcommittee, 1989 - 1993
 Chair, 1991-1993
 Hazardous Waste Committee, 1984 - 1993

American Society of Civil Engineers
 Hazardous Waste Committee, 1981 - present
 Cincinnati Section - Environmental Engineering Group
 Management Group

Association of Environmental Engineering Professors
 Past President, 1993-1994
 President, 1992-1993
 Vice President, 1991-1992
 Member of the Board of Directors, 1991-1994
 Audit Committee - Chair, 1976 - 1977
 AAEE Liaison - Chair, 1988 - 1991

International Association on Water Quality (formerly IAWPRC)
 Specialist Group on Biofilm Systems, 1991 - present
 Management Group, 1994 - present
 Specialist Group on Environmental Engineering Education, 1993 - present
 Chair, 1994 - present

U.S.A. National Committee (USANC)
 AEEP Representative, 1994-2002
 USANC Founders Award Committee Chair, 1994-1995

American Society for Engineering Education
 Accreditation Board for Engineering and Technology (ABET)
 Alternate Director, 1991 - 1994

Sigma Xi
 Tau Beta Pi
 Chi Epsilon

EDITORIAL AND ADVISORY BOARDS:

Journal of Hazardous Materials - Editorial Board
Journal of Environmental Sciences and Health - Associate Editor

U.S. EPA Center for Clean Industrial and Treatment Technologies - Michigan
 Technological University - Science Advisory Board, 1992 - present
 Center for Applied Environmental Technologies, Institute of Advanced Manufacturing Sciences, Inc. -
 Steering Committee, 1991 - present
 WARZYN Engineering, Inc. - Technical Advisory Board, 1990 - present

MUNICIPAL ORGANIZATIONS:

Planning Board, Town of Lee, NH
 Member, 1975 - 1980
 Chairman, 1978 - 1980

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Consultant, 1980 - 1986

Zoning Board of Adjustment, Town of Lee, NH
Member, 1980 - 1986

Durham - UNH Sewer Policy Board
Member, 1979 - Present

Cincinnati, Metropolitan Sanitary District
Appellate Board, 1991 - Present

Planning Advisory Committee, Anderson Township, OH
Member, 1991 - Present

STATE BOARDS:

Ohio Governor's Task Force on Waste Minimization, 1988 - 1991

New Hampshire Solid Waste Management Council
Council Member, 1981 - 1987

State of Ohio Fernald Cleanup Initiative Leadership Team, 1991 - 1992

FUNDED RESEARCH:

1. Aerobic Digestion of Sludge Under Cold Temperature Conditions - Office of Water Resources Research, U.S. Dept of the Interior, \$52,000, 1973 - 1976.
2. Strafford Region Solid Waste Management System - Strafford Regional Planning Commission, \$24,000, 1974 - 1976.
3. Removal of Fluoride from Water by Use of Fluidized Activated Alumina Adsorption - Center for Industrial and Institutional Development, \$9,000, 1975.
4. Water Pollution Potential of Snow Removal Operations - Town of Durham, NH, \$11,000, 1976 - 1977.
5. Water Quality Modeling in the Great Bay Estuary System - Office of Sea Grant, National Oceanic and Atmospheric Administration, \$78,000, 1978.
6. Dispersive Processes for Short Duration Discharges in the Great Bay Estuary System - Office of Sea Grant, National Oceanic and Atmospheric Administration, \$82,000, 1979.
7. Treatment of High Salinity Wastewater with Rotating Biological Contractors - Hubbard Fund, \$15,000, 1978 - 1979.
8. Environmental Engineering in the Oceans - National Science Foundation, \$92,000, 1979 - 1981.
9. Subsurface Disposal System Rejuvenation using Hydrogen Peroxide - Community Services Administration, \$11,000, 1979 - 1981.
10. Pathogen Survival During Forced Aeration Composting of Municipal Sludge - Office of Water Research and Technology, U.S. Dept. of the Interior, \$135,000, 1979 - 1982.

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11. Tertiary Treatment of Municipal Wastewaters Using Seaweeds - Hubbard Fund, \$9,000, 1981 - 1982.
12. The Role of Protozoans in Rotating Biological Contactor Biofilms - National Science Foundation, \$6,000, 1981 - 1982.
13. High Energy Electron Disinfection of Municipal Wastewater Sludge Compost - High Voltage Engineering Corporation, \$2,600, 1981 - 1982.
14. Examination of a Combined Secondary and Tertiary Wastewater Treatment Process for Temperate Regions Using Aquatic Macrophytes and Their Epifloral Biofilms - National Science Foundation, \$343,000, 1982 - 1985.
15. Removal of Heavy Metals by Aquatic Macrophytes in Temperate Regions - National Science Foundation, \$11,000, 1983 - 1984.
16. Evaluation of the Potential for Marine Disposal of Solidified/ Stabilized Inorganic Hazardous Wastes - National Oceanic and Atmospheric Administration, \$80,000, 1983 - 1985.
17. Development of a Dynamic Leaching Test for Hazardous Wastes - New Hampshire Bureau of Hazardous Waste Management, \$24,000, 1984 - 1985.
18. Radon Removal Techniques for Community Public Water Supplies in New Hampshire - U.S. Environmental Protection Agency, \$90,000, 1985 - 1987.
19. Development of a Standard Solid Waste Leaching Test - New Hampshire Office of Waste Management, \$33,000, 1985 - 1987.
20. Development Studies for an Automated Water Filter System - Teledyne Water Pik, \$38,000, 1986 - 1987.
21. Removal of Trace Organics from Municipal Wastewater - Danish Council of Technical and Scientific Research, \$110,000, 1986 - 1987.
22. Biodegradation of Azo Dyes - Ohio Board of Regents, \$90,000, 1988 - 1990.
23. Aerobic Digestion of Recalcitrant Toxics - U.S. EPA, \$72,000, 1988 - 1990.
24. Two-sludge Anaerobic/Aerobic Treatment of CERCLA Leachants in POTWs - U.S. EPA, \$410,000, 1988 - 1990.
25. Biofilm Treatment of Xenobiotics - National Institute of Environmental Health Sciences, \$415,000, 1988 - 1992.
26. Alternative Leaching Scenarios for Solidified/Stabilized Hazardous Wastes - U.S. EPA, \$87,000, 1988 - 1989.
27. Assessment of Solidification/Stabilization for Superfund Contaminated Soils - U.S. EPA, \$133,000, 1988 - 1989.
28. Chemical Fixation of Flue Gas Desulfurization Sludges - Ohio Coal Development Office, \$250,000, 1989 - 1991.
29. Biodegradation of Hazardous Compounds in Rotating Biofilms (Co-PI) - U.S. EPA, \$87,000, 1989.
30. PEI Research Subcontract - PEI, Inc. (later IT Corporation), \$2,756,000, 1989 - 1994.

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31. Assessment of Long Term Durability of Solidified/Stabilized Hazardous Waste Forms U.S. EPA, \$525,000, 1990 - 1993.
32. Microscale Environmental Conditions Present During Biodegradation of Toxic Organics in Biofilms - Ohio Hazardous Substance Research, Education and Management Institute, \$32,000, 1990 - 1992.
33. Stabilization/Solidification Technology Evaluation - E.I. DuPont deNemours and Co., Inc., \$205,000, 1990 - 1992.
34. Assessment of Solidification/Stabilization of Mixed Wastes (co-P.I.) - Westinghouse Materials Company of Ohio, \$560,000, 1990 - 1992.
35. Composting of Municipal Solid Wastes - City of Cincinnati, Ohio, \$150,000, 1990 - 1992.
36. Review and Analysis of Environmental Training Plans - Westinghouse Materials Company of Ohio, \$43,000, 1991.
37. Review and Analysis of RCRA Compliance Refresher Course and Student Testing Material - Westinghouse Environmental Management Company of Ohio, \$23,000, 1991-1992.
38. Construction of a Hazardous Waste Research Facility - Ohio Board of Regents, \$2,406,000, 1991.
39. Transport and Microbial Degradation in Biofilms - National Institute of Environmental Health Sciences, \$880,000, 1992-1995.
40. Review of Operable Unit 2 Draft Remedial Investigation Baseline Risk Assessments - Westinghouse Environmental Management Company of Ohio, \$21,000, 1992.
41. Development of Industrial Workshops - Westinghouse Environmental Management Company of Ohio, \$82,000, 1992-1993.
42. UC/USEPA Cooperative Agreement - U.S. EPA, \$900,000, 1993.
43. Microbial Detoxification/Degradation of Hazardous Wastes (co-P.I.) - National Institutes of Health, \$149,000, 1993-1995.
44. Investigation of Nitrification Tower Upsets at the North Regional Wastewater Treatment Plant - Miami Conservancy District, Dayton, OH, \$95,900, 1994-1996.
45. Volatile Organic Carbon Sources and Control at Metropolitan Sewer District Wastewater Treatment Plants - Metropolitan Sewer District of Greater Cincinnati, \$156,000, 1994-1996.

AWARDS:

ASTM Faculty Fellow, 1984

Diplomate - American Academy of Environmental Engineers, 1985 - present

Listed in: Marquis Who's Who in the East

Marquis Moving Up in America

Marquis Who's Who of Emerging Leaders in America

Marquis Who's Who in American Education

Marquis Who's Who in the World

Dictionary of International Biography

American Men and Women of Science

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PATENTS:

Method and Apparatus for Reducing Levels of Organics in Liquids, Patent No. 4,534,865

Sorption/Anaerobic Stabilization for Control of Organic Pollutants in Wastewater, Patent Pending.

Aerobic Fluidized Bed Reactor with Internal Media Cleaning, Patent Pending.

BOOKS:

Bishop, P., Marine Pollution and Its Control, McGraw-Hill Book Co., New York, 357 pp., 1983.

Colombo, P., Barth, E., Bishop, P., Buelt, J. and Conner, J., Innovative Site Remediation Technology: Stabilization/Solidification, American Academy of Environmental Engineers, Annapolis, MD, 166 pp., 1994.

BOOK CHAPTERS:

Bishop, P. and Kinner, N., "Aerobic Fixed - Film Processes", Chapter 3, Biotechnology, Verlag Chemie, Weinheim, Germany, 114-176, 1986.

Bishop, P., Watts, R. and Robson, M., "Chemical Treatment of Hazardous Wastes," Chapter 7, Hazardous Waste Treatment Processes, MOP FD-18, Water Pollution Control Federation, Washington, D.C., 1990.

REFEREED JOURNALS:

Bishop, P.L., "Removal of Powdered Activated Carbon from Water by Foam Separation", Separation Science and Technology, 13:47-58, 1978.

Bishop, P.L. and Sansoucy, G., "Fluoride Removal from Drinking Water by Fluidized Activated Alumina Adsorption", Journal American Water Works Association, 70:554-559, 1978.

Bishop, P.L. and Farmer, M., "The Fate of Nutrients During Aerobic Digestion", Journal of the Environmental Engineering Division, ASCE, 104:967-977, 1978.

Pierstorff, B. and Bishop, P., "Water Pollution from Snow Removal Operations", Journal of the Environmental Engineering Division, ASCE, 106:377-388, 1980.

Bishop, P., Howard, E., Flinkstrom, M., White, C. and Cooke, R., "Regional Resource Recovery Center Cost Analysis", Journal of the Environmental Engineering Division, ASCE, 106:977-990, 1980.

Bishop, P. and Logsdon, S., "Rejuvenation of Failed Soil Absorption Systems", Journal of the Environmental Engineering Division, American Society of Civil Engineers, 107:47-55, 1981.

Kinner, N. and Bishop, P., "Treatment of Saline Domestic Wastewater Using RBCs", Journal of the Environmental Engineering Division, ASCE, 108:650-664, 1982.

Andrews, T. and Bishop, P., "The Use of Hydrogen Peroxide for Failed Soil Absorption System Rehabilitation", Journal of the New England Water Pollution Control Association, 16(10):32-50, 1982.

Bishop, P. and Logsdon, S., "Rejuvenation of Failed Soil Absorption Systems - Closure", Journal of the

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Environmental Engineering Division, ASCE, 108:1387, 1982.

Bishop, P., "The Scale-Up and Limitation of Physical Oxygen Transfer in Rotating Biological Contactors - A Discussion", Water Science and Technology, Volume 14, Pergamon Press, presented at the 11th International Association on Water Pollution Research Conference, Cape Town, South Africa, 14(8):982-984, 1982.

Kinner, N., Balkwill, D. and Bishop, P., "A Light and Electron Microscopical Investigation of Microorganisms Growing in Rotating Biological Contactor Biofilms", Applied and Environmental Microbiology, 45:1659-1669, 1983.

Kinner, N. and Bishop, P., "Treatment of Saline Domestic Wastewater Using RBCs-Closure", Journal of Environmental Engineering, 190(4):984, 1983.

Eighmy, T., Maratea, D. and Bishop, P., "An Electron Microscopic Examination of Wastewater Biofilm Formation and Structural Components", Applied and Environmental Microbiology, 45:1921-1931, 1983.

Bishop, P. and Godfrey, C., "Nitrogen Transformations During Aerobic Composting of Sewage Sludge", Biocycle. Journal of Waste Recycling, 24(4):34-39, 1983.

Manoliadis, O. and Bishop, P., "Temperature Effects on the Rheology of Sludges", Journal of Environmental Engineering, 110(1):110-114, 1984.

Kinner, N., Maratea, D. and Bishop, P., "An Evaluation of the Bacteria and Protozoa Inhibiting Rotating Biological Contractor Biofilms", Water, Science and Technology, Pergamon Press, 1984.

Eighmy, T. and Bishop, P., "Multiplicity of Aspartate Transport in Thin Wastewater Biofilms", Applied and Environmental Microbiology, 48:1151-1158, 1984.

Eighmy, T. and Bishop, P., "Effect of Reactor Turbulence on the Binding Protein-Mediated Aspartate Transport System in Thin Wastewater Biofilms", Applied and Environmental Microbiology, 50(1):120-124, 1985.

Kinner, N., Maratea, D. and Bishop, P., "An Electron Microscope Evaluation of the Bacteria Inhibiting Rotating Biological Contractor Biofilms During Various Loading Conditions", Environmental Technology Letters, 6:455-466, 1985.

Shively, W., Bishop, P., Brown, T. and Gress, D., "Leaching Tests of Heavy Metals Solidified and Stabilized with Portland Cement", Journal Water Pollution Control Federation, 58:234-241, 1986.

Ossenbruggen, P., Constantine, K., Collins, M. and Bishop, P., "Towards Optimum Control of the Activated Sludge Process with Reliability Analysis", Civil Engineering Systems, 4(2):77-86, 1987.

Campbell, K., El-Korchi, T., Gress, D. and Bishop, P., "Stabilization of Cadmium and Lead in Portland Cement Paste Using a Synthetic Seawater Leachant", Environmental Progress, 6:99-103, 1987.

Eighmy, T. and P. Bishop, "Autotrophic Nitrification and Its Role in Nitrogen Removal in Elodea Nuttallii - Based Aquatic Treatment Systems", Water Supply, 6:119-124, 1988.

Bishop, P., "Leaching of Inorganic Hazardous Constituents From Stabilized/Solidified Hazardous Wastes", Hazardous Waste and Hazardous Materials, 5:129-143, 1988.

Bishop, P., and T. Eighmy, "Aquatic Wastewater Treatment Using Elodea nuttallii", Journal Water Pollution Control Federation, 61:641-648, 1989.

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- Bishop, P., "Academy Volunteers in Education - Editorial", The Diplomat, 25(3):6, 1989.
- Eighmy, T. and P. Bishop, "Distribution and Role of Bacterial Nitrifying Populations in Aquatic Treatment Systems," Water Research, 23:947-955, 1989.
- Cheng, K. and P. Bishop, "Developing a Kinetic Leaching Model for Solidified/Stabilized Hazardous Wastes," Journal of Hazardous Materials, 24:213-224, 1990.
- Dusing, D., P. Bishop and T. Keener, "Effect of REDOX Potential on Leaching from Stabilized/Solidified Waste Materials," Journal of the Air and Waste Management Association, 42:56-62, 1992.
- Cheng, K. and P. Bishop, "Leaching Boundary Movement in Solidified/Stabilized Waste Forms," Journal of the Air and Waste Management Association, 42:164-168, 1992.
- Cheng, K., P. Bishop and J. Isenburg, "Leaching Boundary in Cement-Based Waste Forms," Journal of Hazardous Materials, 30:285-295, 1992.
- Bishop, Paul, Runzhi Gong and Tim Keener, "Effects of Leaching on Pore Size Distribution of Solidified/Stabilized Wastes," Journal of Hazardous Materials, 31:59-74, 1992.
- Cheng, K. and P. Bishop, "Metals Distribution in Solidified/Stabilized Waste Forms After Leaching," Hazardous Wastes and Hazardous Materials, 9:163-171, 1992.
- Cheng, Kuang Ye and Paul Bishop, "Adsorption, Important in Stabilized/ Solidified Waste Forms," Hazardous Waste and Hazardous Materials, 9:289-296, 1992.
- Harmer, C. and P. Bishop, "Transformation of Azo Dye AO-7 by Wastewater Biofilms," Water, Science and Technology, 26(3-4): 627-636, 1992.
- Safferman, Steven, Sandrine Baud-Grasset, Kim Brackett, Patrick Clark and Paul Bishop, "A Systematic Scanning Electron Microscopy Technique for Evaluating Combined Biological/Granular Activated Carbon Treatment Processes," Journal of Environmental Science and Health, A28: 2239-2262, 1993.
- He, Yongjie and Paul Bishop, "The Effect of Acid Orange 7 on the Nitrification Process," Journal of Environmental Engineering, 120: 108-121, 1994.
- Seshadri, Sanjay, Bishop, Paul and Mourad Agha, Amjad, "Anaerobic/Aerobic Treatment of Selected Azo Dyes in Wastewater," Waste Management, 14: 127-137, 1994.
- Zhang, T. and Bishop, P., "Density, Porosity and Pore Structure of Biofilms," Water Research, 28:2267-2277, 1994.
- Zhang, T. and Bishop, P., "Evaluation of Tortuosity Factors and Effective Diffusivities in Biofilms," Water Research, 28: 2279-2287, 1994.
- Fu, Yun-Chang, Hongshen Jiang and Paul Bishop, "An Inhibition Study of the Effect of Azo Dyes on Bioactivity of Biofilms," Water Science and Technology, 29(7): 365-372, 1994.
- Zhang, Tian and Paul Bishop, "Structure, Activity and Composition of Biofilms," Water Science and Technology, 29(7): 335-344, 1994.
- Bishop, Paul, Zhang, Tian and Fu, Yun-Chang, "Effect of Biofilm Structure, Microbial Distributions and Mass Transport on Biodegradation Processes," Water Science and Technology, 31: (Accepted).

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Ma, YiLong, Ahmed Galal, Hans Zimmer, Harry Mark, Zai Huang and Paul Bishop, "Potentiometric Selective Determination of Hydrogen Sulfide by an Electropolymerized Membrane Electrode Based on Binaphthyl-20-Crown-6", Analytica Chimica Acta (Accepted).

Kupferle, M., T. Chen, V. Gallardo, D. Lindberg, S. Safferman, D. Bishop and P. Bishop, "Anaerobic/Aerobic Treatment of Hazardous Waste Leachates in Publicly-Owned Treatment Works: An Innovative Approach," Water Environment Research (Accepted).

Zhang, Tian, Yun Fu and Paul Bishop, "Competition in Biofilms," Water Science and Technology, 29(11-12): (Accepted).

Jiang, Henry and Paul Bishop, "Aerobic Biodegradation of Azo Dyes in Biofilms," Water Science and Technology, 29(11-12): (Accepted).

Fu, Yun-Chang, Tian Zhang and Paul Bishop, "Determination of Diffusivity of Oxygen in Biofilms Grown in a Completely Mixed Biodrum Reactor," Water Science and Technology, 29(11-12): (Accepted).

Fu, Yun-Chang and Paul Bishop, "The Evaluation of Respiration Rate in Fixed-Film Systems Under Various Organic Loading Rates," Water Environment Research (Accepted).

Galal, A., Wang, Z., Karagözler, A., Zimmer, H., Mark, H. and Bishop, P., "A Potentiometric Iodide (and Other) Ion Sensor Based on a Conducting Polymer Film Electrode. II - Effect of Electrode Conditioning and Regeneration Techniques," Analytica Chimica Acta (Accepted).

Baker, Peter and Paul Bishop, "Prediction of Metals Leaching Rates from Actual S/S Wastes Using the Shrinking Unreacted Core Leaching Procedure," Journal of Hazardous Materials (Accepted).

Zhang, Tian, Yun-Cheng Fu and Paul Bishop, "Competition for Substrate and Space in Biofilms," Water Environment Research (Accepted).

Zhang, T., Fu, Y., Bishop, P., Kupferle, M., Fitzgerald, S., Jiang, H. and Harmer, C., "Transport and Biodegradation of Toxic Organics in Biofilms," Journal of Hazardous Materials (Accepted).

Ma, YiLong, Ahmad Galal, Suzanne Lunsford, Hans Zimmer, Harry Mark, Zai Huang and Paul Bishop, "Poly(Binaphthyl-20-Crown-6) as Receptor Based Molecular Selective Potentiometric Electrodes for Catecholamines and 1,2-Dihydroxybenzene Derivatives," Biosensors & Biotechnology (Submitted).

You, Guangrong, Gregory Sayles, Margaret Kupferle and Paul Bishop, "Anaerobic Aqueous DDT Biodegradation by a Mixed Consortia and Enhancement by Surfactant Addition," Applied and Environmental Microbiology (Submitted).

Safferman, Steven and Bishop, Paul, "An Aerobic Fluidized Bed Reactor with Internal Media Cleaning," Journal of Environmental Engineering (Submitted).

Safferman, Steven and Bishop, Paul, "Intermittent Operation of an Aerobic Fluidized Bed Reactor with Internal Media Cleaning," Journal of Environmental Engineering (Submitted).

Fitzgerald, Sean and Bishop, Paul, "Two Stage Anaerobic/Aerobic Treatment of Sulfonated Azo Dyes," Journal of Environmental Engineering (Submitted).

REFEREED PROCEEDINGS AND BOOKS:

Brown, T. and Bishop, P., "Alkalinity Releases and the Leaching of Heavy Metals from Stabilized/Solidified

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Wastes", Abstracts, 5th International Conference on Chemistry for Protection of the Environment, Leuven, Belgium, 159-161, 1985.

El-Korchi, T., Melchinger, K., Kolvites, B., Gress, D. and Bishop, P., "The Effect of Heavy Metals and Organic Solvents on the Microstructure of Cement Stabilized Hazardous Wastes", Proceedings, Eighth International Conference on Cement Microscopy, Orlando, FL, 132-143, 1986.

Brown, T., Bishop, P. and Gress, D., "Use of an Upflow Column Leaching Test to Study the Release Patterns of Heavy Metals from Stabilized/ Solidified Heavy Metal Sludges, Hazardous and Industrial Solid Waste Testing", 6th volume, ASTM STP 933, edited by D. Lorenzen et al., ASTM, Philadelphia, PA, 79-92, 1986.

Bishop, P., Brown, T. and Shively, W., "Alkalinity Releases and the Leaching of Heavy Metals from Stabilized/Solidified Wastes", Chemistry for Protection of the Environment 1985, edited by L. Pawlowski, G. Alaerts and W. Lacy, Elsevier Science Publishers, Amsterdam, 217-233, 1986.

Brown, T., Bishop, P. and Gress, D., "Use of Upflow Column Leaching Test to Study the Release Patterns of Heavy Metals from Stabilized/Solidified Heavy Metal Sludges, Hazardous and Industrial Solid Waste Testing and Disposal", Vol. 6, edited by D. Lorenzen, ASTM, Philadelphia, PA, 79-92, 1986.

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Bishop, P. and Chesbro, W., "Pathogen Survival During Forced Aeration Composting of Municipal Wastewater Sludge", Water Resources Research Center Research Report No. 37, University of New Hampshire, 159 pages, December 1982.

Bishop, P., "Solid Waste Management Plan", Tri-County Solid Waste Management District, Manchester, NH, 121 pp., 1985.

Bishop, P., "Development of a Dynamic Leaching Test for Stabilized/ Solidified Hazardous Wastes", New

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Hampshire Office of Waste Management, Concord, NH, 144 pp., June 1985.

Bishop, P., "Examination of a Combined Secondary and Tertiary Wastewater Treatment Process for Temperate Regions Using Aquatic Macrophytes and Their Epifloral Biofilms", Completion Report, National Science Foundation, Washington, D.C., 245 pp., November 1985.

Cullinane, M., Bishop, P., Jones, L., Pitt, W. and Tittlebaum, M., "Physical Treatment", Research Needs Workshop: Hazardous Waste Treatment and Disposal, edited by R. Loerner, G. Parkin and W. Pipes, National Science Foundation, 35-42, 1986.

Bishop, P. and Gress, D., "Evaluation of the Potential for Marine Disposal of Solidified/Stabilized Inorganic Hazardous Wastes", Completion Report, Office of Sea Grant, National Oceanic and Atmospheric Administration, 106 pp., 1986.

Bishop, P., "Development of a Standardized Solid Waste Leaching Procedure", Completion Report, New Hampshire Office of Waste Management, Concord, NH, 121 pp., December 1986.

Bishop, P., "Simplified Manual for Use of SAS and SAS/GRAPH", Department of Environmental Engineering, Technical University of Denmark, 132 pp., March 1987.

Sundberg, D., P. Bishop and L. Turner, "Characterization of the Diffusion of Organic Liquids from Dilute Aqueous Solutions into Polymers", Final Report, Teledyne Water Pik, Fort Collins, CO, 46 pp., 1987.

Bishop, Paul and Tim Keener, "Chemical Fixation of Flue Gas Desulfurization Sludges and Fly Ash", Final Report, Ohio Coal Development Office, Columbus, OH, 305 pp., 1992.

Bishop, Paul, Riley Kinman, Margaret Kupferle, Jon Reid and Jeffrey Eberhard, "Composting Municipal Wastes," Final Report, City of Cincinnati Department of Public Works, 128 pp., 1992.

Bishop, P., M. Beljin, P. Biswas, J. Eberhard, L. Eckart, J. Reid and J. Uber, "Review of the Fernald Environmental Management Project Remedial Investigation Baseline Assessment for Operable Unit 2," Final Report, Westinghouse Environmental Management Company of Ohio, 40 pp., 1992.

Hauser, Thomas and Paul Bishop, "Workshop on Transite Decontamination, Dismantle- ment and Recycle/Disposal," Final Report submitted to Office of Environmental Restoration and Waste Management, U.S. Department of Energy, 1993.

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CURRICULUM VITA FOR**DAVID E. DANIEL****College Education**

B.S. University of Texas, 1972 (Civil Engineering)
M.S. University of Texas, 1974 (Civil Engineering)
Ph.D. University of Texas, 1980 (Civil Engineering, Title of Dissertation:
"Moisture Movement in Soils in the Vicinity of Waste Disposal Sites")

Academic Experience

- Assistant Professor, University of Texas, 1981 to 1985
- Associate Professor, University of Texas, 1985 to 1991
- Professor, University of Texas, 1991 to Present
- L.B. (Preach) Meaders Professor of Civil Engineering, University of Texas, 1992 - Present
- Associate Chairman for Academic Affairs, University of Texas, Department of Civil Engineering, 1994 - Present

Research Assignments

Geosynthetic Research Institute, Drexel University, Fall Semester, 1991.

Courses Taught

Undergraduate:	Introduction to Soil Mechanics Foundation Engineering Earth Slopes and Retaining Structures
Graduate:	Seepage and Dams Measurement of Soil Properties Shearing Behavior of Soils Geotechnics of Landfill Design Geotechnics of Waste Site Remediation Consolidation and Settlement of Soils
Continuing Education:	Geotechnical Engrg. for Waste Disposal Projects (1982-1987) Management of Hazardous Wastes, 1987 Clay Liners and Covers for Waste Disposal Facilities (3 to 5 Times per Year Since 1988) Geosynthetic Clay Liners for Waste Containment (Biannually Since 1993) Sanitary Landfill Design, Annually 1989-1991 Groundwater Contamination from Petroleum Hydrocarbons (Annually Since 1990) (See Also Training Workshops)

Engineering Experience

Geotechnical Engineer, Woodward-Clyde Consultants, San Francisco, 1974-1977

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Representative Consulting Experience**Permeability Testing and Assessment:**

- Field Permeability Testing on Natural Clay Liner, Shreveport Louisiana; International Paper Company, 1979.
- Laboratory Permeability Tests on Unsaturated Soils and Rock Cores from Colorado; D'Appolonia Engineers, 1981.
- Laboratory Permeability Tests on Unsaturated Soil Samples from Ohio; Law Engineering and Testing Co., 1982.
- Laboratory Permeability Tests on Unsaturated Soil Samples from Tennessee; Union Carbide, 1983.
- Laboratory Permeability Tests on Soil Samples Permeated with Organic Solvents, Newark, New Jersey; Dames and Moore, 1985.
- Field Permeability Testing on Compacted Clay Cover over Landfill, Niagara Falls, New York; Bechtel National, 1985.
- Permeability Testing of Asphaltic Concrete for Landfill Cover in New England; Retech, 1987, 1988.
- Permeability Testing of Soil-Bentonite Mixes from California; Trautwein Soil Testing Equipment Co., 1987.
- Permeability Testing of Closure Cap Soils at Oak Ridge, Tennessee; Martin Marietta Energy Systems, 1988.
- Permeability of Vertical Cutoff Wall Near Sacramento; SMW Seiko, 1991.
- Permeability of Geosynthetic Clay Liners; National Seal Company, 1992.
- Permeability Testing of Closure Cap Soils, Martin Marietta Energy Systems, 1992.
- Permeability of Natural Clay Liner at Weldon Springs Remedial Action Project, M-K Ferguson, Weldon Springs, Missouri, 1992-93.

Specialized Testing of Unsaturated Soils:

- Moisture-Suction Relationships for Desiccated Mine Tailings from Wisconsin; Exxon Minerals Co., 1984.
- Moisture-Suction Relationships for Sand/Bentonite Mixture; E.I. Dupont de Nemours Co., 1985.
- Moisture-Suction and Permeability-Suction Relationships for Soil from South Carolina; Interra Corp., 1988.
- Consolidation of Compacted Clay from Hazardous Waste Landfill Cell; Concord Resources Group, 1991.

Ponds and Lagoons:

- Water-Holding Pond, San Marcos, Texas; Butler Manufacturing, 1981.
- Pond for Waste Water from Uranium Mine, Southern Texas; Vinson and Elkins, 1982.
- Pond for Textile Sludge, San Marcos, Texas; West Point Pepperell, 1983.
- Seepage from Clay-Lined Pond at Hazardous Waste Disposal Site, Oklahoma; U.S. Pollution Control, 1984.
- Basin F at Rocky Mountain Arsenal, Denver, Colorado; Rivkin, Radler, Dunn, and Bayh, 1987.
- Liner for Paper Mill Plant Lagoons, Marathon, Ontario, Canada; Geo-Canada, Ltd., 1992.

Municipal Solid Waste Landfills:

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- Review of Application for Proposed Landfill South of Houston, Texas; Mavis Kelsey, 1983.
- Review of Application for Proposed Landfill near Galveston, Texas; Cook-Joyce, 1983-84.
- Review of Application for Proposed Landfill near Crystal Lake, Illinois; Bishop and Callas, 1985.
- Cover for Landfill in Northern New Jersey; Converse Consultants East, 1986.
- Clay Liner for Landfill in Somerset County, Pennsylvania; Chambers Development Corp., 1987.
- Clay Liner for Landfill in Eau Claire, Wisconsin; Ayres Associates, 1987-88.
- Clay Liner for Landfill in Central New Jersey; Budd Lamer, et al., 1988.
- Clay Liner and Soil Cover for Landfill in Edgemont, South Dakota; SDDS, Inc., 1989-1991.
- Proposed Landfill near Toronto, Canada; Geo-Canada Ltd; 1992.
- Keller Canyon Landfill, Contra Costa County, California; Browning-Ferris Industries, 1992.
- Final Covers for Solid Waste Landfills in California; GeoSyntec Consultants and California Water Quality Board, 1992-93.
- Proposed Eagle Mountain Landfill in Southern California, Mine Reclamation Co., Palm Springs, 1992-94.
- Groundwater Pressure Relief System for Trinity Landfill, Laidlaw Environmental Services, Inc., Fort Worth, Texas, 1993.
- Mica Landfill, CH2M Hill, Spokane, Washington, 1993.
- Construction Delays, Mason County Landfill, Michigan, 1993.
- Geosynthetic Clay Liner, Coffin Butte Landfill, EMCON Northwest, Portland, OR, 1994.

Industrial or Hazardous Waste Landfills and Closures:

- Clay Liner for Landfill near Baton Rouge, Louisiana; Browning-Ferris Industries, 1983.
- Vadose Zone Monitoring System at Hazardous Waste Landfill in Pacific Northwest; Woodward-Clyde Consultants, 1984.
- Leakage from Landfill in Western Pennsylvania; Pennsylvania Dept. of Environmental Resources, 1985.
- Clay Liner for Landfill in Western Pennsylvania; Pennsylvania Dept. of Environmental Resources, 1986.
- Clay Liner for Landfill near Last Chance, Colorado; Browning-Ferris Industries, 1988.
- Cover System Design Guidance Manual, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS, 1990.
- Landfill Issues in Chemical Waste Disposal, Hoechst-Celanese, Corpus Christi, TX, 1990.
- Cover Materials for Hazardous Waste Cells, Texas Gulf Coast, Engineering Science, Austin, Texas, 1991.
- Disposal Unit 1, Highway 36 Landfill, Colorado, Concord Resources, 1991.
- Construction Claim, Hazardous Waste Disposal Cell, Dow Chemical Company and Merit Environmental Services, Baton Rouge, LA, 1991.
- Closure Cap for Hazardous Waste Landfill, Buttonwillow, California; Laidlaw Environmental Services (Lokern), Inc., 1992.
- Groundwater Contamination from Waste Disposal Center, Sinton, Texas; Woodard, Hall & Primm, 1993-94.
- USPCI Shuqualak Mountain Facility, Noxubee County, Mississippi; Mississippi Dept. of Environmental Quality, 1993.
- FTMI Disposal Facility, Brooksville, Mississippi; Mississippi Dept. of Environmental Quality, 1993.
- Industrial Waste Pits, Union Carbide, Texas City, TX, 1994.

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Radioactive Waste Disposal Facilities:

- Review Panel for Hanford's Barrier Program, Richland, Washington; Ebasco, 1992.
- Value Engineering Panel for Hanford Protective Barrier Plan, Westinghouse Hanford Co., 1993.
- Low-Level Radioactive Waste Disposal Facility, Chem-Nuclear Systems, Inc., Barnwell, South Carolina, 1993.
- Asphalt Barrier, Battelle Pacific Northwest Laboratories, Richland, Washington, 1993.
- Surface Barrier, Westinghouse Hanford Co., Richland, Washington, 1993-94.
- Technical Advisor, Buried Waste Integrated Demonstration, EG&G Idaho, 1994.
- Alternative Covers for Mixed Waste Integrated Demonstration, Sandia National Laboratories, 1994.

Site Remediation Projects:

- Leaky Landfill on Texas Gulf Coast; Woodward-Clyde, 1983.
- Cleanup of Uncontrolled Hazardous Waste Dump near Baton Rouge, Louisiana; Taylor, Porter, Brooks and Phillips, 1983.
- Cover System for CAPCA Closure Project, Oak Ridge Y-12 Operations, Oak Ridge, Tenn.; Martin Marietta Energy Systems, 1988.
- Cover System for Lone Pine Landfill, New Jersey; AWD Associates, 1990.
- Clay Liner in Cap for Mixed Waste Management Facility, Savannah River Operations, Aiken, SC; U. S. Dept. of Energy, 1990.
- Closure Systems at DOE's Portsmouth, Ohio, Gaseous Diffusion Plant; Martin-Marietta Energy Systems, Oak Ridge, TN, 1990-1991.
- Alternative Cover System for Stabilized Hazardous Waste Sludge, Texas Gulf Coast; McClelland Engineers (Environmental), Houston, TX, 1990.
- Remediation of Chromium Waste in Baltimore; Soil Safe, Inc., 1991.
- Remediation of Brlo Refining Site, Houston; Woodward, Hall & Primm, 1992.
- Soils for Final Cover Systems at Oak Ridge, Tennessee; Martin Marietta, 1991-92.
- Panel on In Situ Containment Technologies, Univ. of Buffalo and DuPont Chemicals, 1992-93.
- Helen Kramer Superfund Site, New Jersey, U.S. Army Corps of Engineers, 1994.

Cost Allocation for Site Remediation Projects:

- Allocation of Cleanup Costs at Hazardous Waste Dump in Louisiana; Taylor, Porter, Brooks, and Phillips, 1983.
- Rocky Mountain Arsenal, Denver, Colorado; Rivkin, Radler, Dunn, and Bayh, 1987.
- Brlo, Motco, and Other Sites Near Houston; Monsanto, 1993-94.

Deep Wells and Caverns:

- Release of Contaminants from Solution Mine in Salt Dome, Southern Texas; United Resource Recovery, 1988.

Expert Testimony:

- Sult on Allocation of Cleanup Costs at Hazardous Waste Dump in Louisiana; Taylor, Porter, Brooks, and Phillips, 1983.
- Hearing to Revoke License for Hazardous Waste Disposal Facility in Oklahoma; U.S. Pollution Control, Inc., 1984.

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- Hearing to Establish Laws in Texas Concerning Regulation of Hazardous Waste Disposal; Governor's Select Committee on Waste Management, 1984.
- Hearing to Revoke Permit for Hazardous Waste Landfill in Western Pennsylvania; Pennsylvania Dept. of Environmental Resources, 1985.
- Hearing to Establish Regulations on Disposal of Waste in Illinois; Illinois Pollution Control Board, 1985.
- Hearing on Permit Application for Municipal Waste Landfill Near Crystal Lake, Illinois; Bishop and Callas, 1985.
- Hearing to Deny Permit for Hazardous Waste Landfill in Western Pennsylvania; Pennsylvania Dept. of Environmental Resources, 1986.
- Hearing on Permit Application for Hazardous Waste Disposal Facility in Louisiana; CECOS, 1989.
- Hearing on Permit Application for Municipal Waste Landfill In Edgemont, South Dakota; SDDS, 1989, 1990.
- Suit on Constitutionality of Law Concerning Legislative Review of Permit Applications for Large Solid Waste Landfills in South Dakota; SDDS, 1991.
- Hearing on Application for Fly Ash Disposal Permit for Texas Utilities Mining Company, Dallas, Texas; 1991.
- Suit on Insurance Coverage for Cleanup Costs at Texas Sites, Monsanto Company, 1992-Present.

Review of EPA Manuals and Documents:

- Handbook for Slurry-Wall Cutoffs, 1982.
- Technical Resource Document on Permeability Testing, 1984.
- Technical Resource Document on Clay Liners, 1985.
- Technical Resource Document on Hazardous Waste Impoundments, 1989.
- Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites, 1990
- Engineering Bulletin on Final Covers, 1991
- Engineering Bulletin on Vertical Cutoff Walls, 1991
- Technical Manual for Solid Waste Disposal Facility Criteria - 40 CFR Part 258, 1992

Advisory Boards and Professional Boards:

- Organizing Committee, Madison Waste Conference, Univ. of Wisconsin, 1989 - Present
- Technology Advisory Board, Warzyn Engineering, Madison Wisconsin, 1991-92.
- Technical Advisory Panel, Browning-Ferris Industries, 1992-93.
- Board of Directors, United States Society of Universities Conducting Geotechnical Engineering Research, 1992-93.
- Member, Geotechnical Board, National Research Council, 1993-1994.
- Member, Board on Energy and Environmental Systems, National Research Council, National Academy of Sciences, 1994-present

Training Workshops:

- Clay Liners, D'Appolonia Engineers, Pittsburgh, Pennsylvania, 1982.
- Waste Disposal, Law Engineering and Testing Co., Atlanta, Georgia, 1985.
- Clay Liners, Chen and Associates, Denver, Colorado, 1986.
- Clay Liners and Soil Permeability, Woodward-Clyde Consultants, St. Louis, Missouri, 1986.
- Field Testing of Soil Liners, Earth Technology Corp., Long Beach, California, 1986.

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- Site Remediation, Center for Hazardous Materials Research, Pittsburgh, Pennsylvania, 1987.
- Landfills and Impoundments, Association of Engineering Geologists, Atlanta, Georgia, 1987.
- Requirements for Hazardous Waste Landfill Design, Construction, and Closure; U.S. EPA, San Francisco, Seattle, Dallas, Chicago, Denver, Kansas City, Philadelphia, Atlanta, New York City, and Boston, 1988.
- Waste Disposal, Studio Geotecnico Italiano, Milan, Italy, 1989.
- Clay Liners and Covers, Ohio EPA, Columbus, Ohio, 1989.
- Landfill Design Course, New York Dept. of Environmental Conservation, Albany, New York, 1989.
- Clay Liners and Covers, Michigan Dept. of Natural Resources, Holland, Michigan, 1989.
- Advanced Landfill Design, Construction, and Closure Seminar, New York Dept. of Environmental Conservation, Albany, New York, 1990.
- Clay Liners and Covers for Landfills, for Waste Management, Inc., Chicago, 1991.
- Construction Quality Assurance for Landfills, New York Dept. of Environmental Conservation, Albany, New York, 1990, 1991, 1992.
- Waste Containment Barriers, Studio Geotecnico Italiano, Milan, Italy, 1990.
- Design and Construction of RCRA/CERCLA Final Covers; U. S. EPA, Atlanta, Philadelphia, Boston, Dallas, Kansas City, Denver, New York, Chicago, Seattle, and San Francisco, 1990; Albany, NY, 1992.
- Construction Quality Assurance and Quality Control for Waste Containment Facilities; Mid-Atlantic Branch, Solid Waste Association of North America, Annapolis, MD, 1994.
- Construction Quality Assurance and Quality Control for Waste Containment Facilities; U.S. EPA, Boston, Atlanta, New York, Philadelphia, Dallas, San Francisco, Seattle, Chicago, Kansas City, Denver, 1994.

Honors and Awards

Tau Beta Pi

Phi Kappa Phi

Norman Medal, American Society of Civil Engineers, 1975

Croes Medal, American Society of Civil Engineers, 1984

Outstanding Paper Award, Texas Section, ASCE, 1980

Listed in *Who's Who in Engineering*

Listed in *International Who's Who in Engineering*

Listed in *Who's Who in American Education*

Listed in *Who's Who in Science and Engineering*

William J. Murray Fellowship in Engineering, 1985 - 1992

Faculty Excellence Award, College of Engineering, 1989

Standards Development Award, American Society for Testing and Materials, 1991

L.B. (Preach) Meaders Professorship in Engineering, Univ. of Texas, 1992 - Present.

Member, Geotechnical Board, National Research Council, 1993 - 1994.

Special Service Award, American Society for Testing and Materials, 1994.

Journal Editorships

Editor, *Journal of Geotechnical Engineering*, American Society of Civil Engineers, 1992 - Present.

Professional Registration

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Registered Professional Engineer in Texas, Mississippi, and Delaware

Professional Society Committees

ASTM Committee D-18 on Soil and Rock (1981-present)
ASTM Subcommittee D-18.04 on Ground Water and Hydrologic Properties of Soil and Rock
(Chairman, 1986-1991)
ASTM Subcommittee D-18.14 on Geotechnics of Waste Management (1981-Present)
ASTM Subcommittee D-18.20 on Hydraulic Barriers (1981-present)
ASTM Committee D34 on Waste Management (1987-1990)
ASTM Committee D35 on Geosynthetics (1990-present)
ASCE Committee on Environmental Geotechnology, Geotechnical Engineering Division
(Chairman, 1987-92)
ASCE Committee on Computer and Numerical Methods, Geotechnical Engineering Division
(Control Group Member, 1984-88)
ASCE Committee on Publications in Geotechnical Engineering (Chairman, 1992- present)
ASTM Conference Co-Chairman for 1993 Symposium on "Hydraulic Conductivity and Waste
Contaminant Transport in Soils"
ASCE Organizing Committee for 1995 Specialty Conference on "The Geoenvironment 2000"
(Chairman, 1991-Present)

Sponsored Research Projects

"Computer Modeling of a Groundwater Movement in Soils beneath Waste Disposal Sites,"
Bureau of Engineering Research, 1981, \$3,000.

"Moisture Movement in Soils beneath Solar Evaporation Ponds," Underground Resource
Management, 1981, \$30,000.

"Compacted Clay for Lining Toxic Waste Disposal Ponds," University Research Institute,
1982, \$4,500.

"Design of Pile Foundations for Tension-Leg Platforms," Marathon Oil Company, Mobil
Research and Development Corp., and Phillips Petroleum Company, 1982, \$24,000.

"Effects of Hydraulic Gradient and Field Testing on Measurement of Hydraulic Conductivity of
Soil," U.S. EPA, Municipal Environmental Research Laboratory, Solid and Hazardous Waste
Research Division, 1982, \$144,785.

"Permeability of Compacted Clay Used to Line Waste Disposal Pits," National Science
Foundation, 1982, \$48,000.

"Analysis of Groundwater Flow at a Site Near Pampa, Texas," Underground Resource
Management, 1982, \$2,500.

"Feasibility of Sealing Disposal Pits for Drilling Fluids with Sand Blankets or Synthetic
Fabrics," Texas Petroleum Research Committee, 1982, \$15,112.

"Effects of Landfill Leachates on Natural Liner Systems," Chemical Manufacturers'
Association, 1983, \$39,980, (with Dr. H. M. Liljestrand).

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- "Moisture-Suction and Permeability of Unsaturated Soil," Woodward-Clyde Consultants, 1983, \$10,000.
- "Monitoring the Vadose Zone near Low-Level Radioactive Waste Disposal Sites," Texas Low-Level Radioactive Waste Disposal Authority, 1984, \$4,983.
- "Stabilization of Compacted Clay against Attack by Organic Chemicals," Chemical Manufacturers' Association, 1984, \$35,000.
- "Migration of Simulated Chemical Wastes through the Ground," University Research Institute, 1984, \$5,516.
- "Optimizing Construction Criteria for Hazardous Waste Clay Liners," U.S. EPA, Hazardous Waste Engineering Research Laboratory, 1985, \$54,327.
- "Rate of Flow of Leachate through Clay Soil Liners," U.S. EPA, Hazardous Waste Engineering Research Lab., 1985, \$162,257, (with Dr. H. M. Liljestrand).
- "Disposal of Low-Level Radioactive Waste at a Site Underlain by Evaporite Deposits," Texas Low-Level Radioactive Waste Disposal Authority, 1985, \$27,604 (with Dr. P. P. Nelson).
- "Early Warning Monitoring Systems for Hazardous Waste Disposal Sites," University Research Institute, 1985, \$5,000.
- "Hazardous Waste Management Approaches to Protect Water Quality," Texas Water Development Board, 1986, \$214,651, (with Drs. R. C. Loehr and R. J. Charbeneau).
- "Comparison of Federal and State Regulations for Disposal of Mixed Radioactive and Hazardous Waste," Texas Low-Level Radioactive Waste Disposal Authority, 1986, \$5,077.
- "Thickness of Clay Liners," U.S. EPA, Hazardous Waste Engineering Research Laboratory, 1987, \$35,931, (with Dr. R. J. Charbeneau).
- "Electrokinetic Detoxification of Contaminated Soils," State of Texas, 1988-89, \$44,500, (with Dr. H. M. Liljestrand).
- "Land Disposal Research Needs - A Forward Oriented Review," Environmental Protection Agency, 1989-90, \$75,000 (with R.C. Loehr).
- "Innovative Technologies for Capping Land Disposal Facilities," Gulf Coast Hazardous Substance Research Center and U. S. Environmental Protection Agency, 1989-90, \$33,000.
- "Removal of Organics from Contaminated Sludges and Soils with Surfactants and Electricity," State Hazardous Waste Management Research Funds, 1989-90, \$25,000.
- "Permeability Study," Hall Southwest Water Consultants, Inc., 1989, \$40,000.
- "Barrier Equivalency of Liner and Cap Materials," U. S. Environmental Protection Agency, 1989-93, \$282,365.

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"Construction of Disposal Units," Texas Low-Level Radioactive Waste Disposal Authority, 1990, \$9,062.

"Electrokinetic Decontamination of Soils," Gulf Coast Hazardous Substance Research Center, 1991-92, \$32,115.

"Construction Quality Assurance for Waste Containment Facilities," (with R. M. Koerner), U. S. Environmental Protection Agency, 1991-1993, \$189,964.

"Effects of Partial Wetting of Gundle on Strength and Hydrocarbon Permeability," Gundle Lining Systems, Inc., 1991-1992, \$14,797.

"Enhanced Remediation of Contaminated Soil with In Situ Soil Heating and Vapor Extraction," (with R. J. Charbeneau and H. M. Liljestrand), Environmental Solutions Program, 1991-1992, \$24,814.

"Composite Geosynthetic Materials to Prevent Environmental Damage from Accidental Release of Stored Chemicals," Texas Advanced Technology Program, 1991, 1993, \$130,000.

"Enhanced Vapor Extraction of Organics from Contaminated Soil Using Radio Frequency Heating," Gulf Coast Hazardous Substance Research Center, 1992-93, \$122,639.

"Effects of Leachate on the Permeability of Bentonite and Modified Bentonite in Gundle," Gundle Lining Systems, Inc., 1992-93, \$14,997.

"Analysis of Two Proposed Hazardous Waste Landfills," Mississippi Department of Environmental Quality and Mississippi State University, 1992, \$17,952.

"Use of Recycled Waste Tires for Pollution Prevention from Leaking Hydrocarbon Storage Tanks and Pipelines," Environmental Solutions Program, 1992-93, \$23,675.

"In-Situ Integrated Program Technical Support Group on In-Situ Containment," Battelle Pacific Northwest Laboratories, 1993-94, \$38,297.

"DNAPL Removal from Soil Using Surfactant-Enhanced Flushing in a Bench-Scale Model Aquifer," Environmental Solutions Program, 1993-94, \$22,204.

"Performance of Waste Containment Systems," (with R.M. Koerner at Drexel University and Rudy Bonaparte at GeoSyntec Consultants), U.S. Environmental Protection Agency, 1993-96, \$900,000.

"Workshop on Cone Penetration Testing," (with K.H. Stokoe), U.S. Army Research Office, 1994, \$13,783.

Research Grants

Grant from Vulcan Materials Company for Research on Clay Liners, 1991-92, \$14,000.

Grant from James Clem Corporation for Research on Geosynthetic Clay Liners, 1992, \$10,000.

Grant from Gundle Lining Systems for Research on Geosynthetic Clay Liners, 1993-94, \$21,000.

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Books

Geotechnical Practice for Waste Disposal, D. E. Daniel (Ed.), Chapman and Hall, London, 1993, 683 p.

Waste Containment Systems: Construction, Quality Assurance, and Quality Control, David E. Daniel and Robert M. Koerner, ASCE Press, New York (in press & scheduled for release in 1995)

Chapters of Books

Daniel, D. E., "Waste Disposal and Underground Storage," in *Ground Engineer's Reference Book*, F. G. Bell (ed.), Butterworths, London, 1987, pp. 43/1-43/10.

Daniel, D.E., "Hydraulic Conductivity Tests for Clay Liners," *Geotechnical and Geohydrological Aspects of Waste Management*, D. Van Zyl et al. (eds.), Lewis Publishers, Chelsea, Michigan, 1987, pp. 15-34.

Brown, K. W., and D. E. Daniel, "Influence of Organic Liquids on the Hydraulic Conductivity of Soils," Section 4.3 in Chapter 4 of *Land Disposal of Hazardous Waste*, J.R. Gronow, A.N. Schofield, and R.K. Jain (eds.), Ellis Horwood Limited, Chichester, England, 1988, pp. 199-216.

Daniel, D.E., and K.W. Brown, "Landfill Liners: How Well Do They Work and What Is Their Future?" Section 4.6 in Chapter 4 of *Land Disposal of Hazardous Waste*, J.R. Gronow, A.N. Schofield, and R.K. Jain (eds.), Ellis Horwood Limited, Chichester, England, 1988, pp. 235-244.

Daniel, D.E., and C.D. Shackelford, "Containment of Landfill Leachate with Clay Liners," Chapter 5.3 of *Sanitary Landfilling*, T.H. Christensen, R. Cossu, and R. Stegmann (Eds.), Academic Press, London, 1989, pp. 323-342.

Daniel, D.E., "Overview of Geoenvironmental Principles Applied to Remediation of Contaminated Waste Disposal Sites," in *Environmental Geotechnology*, M. A. Usmen and Y. B. Acar (Eds.), A. A. Balkema, Rotterdam, The Netherlands, 1992, pp. 311-320.

Daniel, D. E., "Introduction," Chapter 1 of *Geotechnical Practice for Waste Disposal*, D. E. Daniel (Ed.), Chapman and Hall, London, 1993, pp. 1-14.

Daniel, D.E., "Landfills," Chapter 5 of *Geotechnical Practice for Waste Disposal*, D. E. Daniel (Ed.), Chapman and Hall, London, 1993, pp. 97-112.

Daniel, D.E., "Clay Liners," Chapter 7 of *Geotechnical Practice for Waste Disposal*, D. E. Daniel (Ed.), Chapman and Hall, London, 1993, pp. 137-163.

Daniel, D.E., and R.M. Koerner, "Cover Systems," Chapter 18 of *Geotechnical Practice for Waste Disposal*, D. E. Daniel (Ed.), Chapman and Hall, London, 1993, pp. 455-496.

Charbeneau, R.J., and D.E. Daniel, "Contaminant Transport in Unsaturated Flow," Chapter 15 of *Handbook of Hydrology*, McGraw-Hill, New York, 1993, pp. 15.1 - 15.54.

Conference Proceedings

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Hydraulic Conductivity and Waste Contaminant Transport, David E. Daniel and Stephen J. Trautwein (Eds.), American Society for Testing and Materials, Philadelphia, 1994.

Refereed Publications

- Daniel, D. E., and R. E. Olson, "Stress-Strain Properties of Compacted Clays," *Journal of the Geotechnical Engineering Division*, American Society of Civil Engineers, Vol. 100, No. GT10, 1974, pp. 1123-1136.
- Olson, R. E., Daniel, D. E., and T. K. Liu, "Finite Difference Analyses of Sand Drain Problems," *Proceedings*, American Society of Civil Engineers Specialty Conference on Analysis and Design in Geotechnical Engineering, June, 1974, Vol. 1, pp. 85-110.
- Johnson, L. J., Daniel, D. E., Abelle, W. V., Ledbetter, J. O., and W. R. Hansen, "Effects from Past Solid Waste Disposal Practices," *Environmental Health Perspectives*, Vol. 27, 1978, pp. 215-221.
- Daniel, D. E., Hamilton, J. M., and R. E. Olson, "Suitability of Thermocouple Psychrometers for Studying Moisture Movement in Unsaturated Soils," in *Permeability and Groundwater Contaminant Transport*, ASTM STP 746, T. F. Zimmie and C.O. Riggs (Eds.), American Society for Testing and Materials, Philadelphia, 1981, pp. 84-100.
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ATTACHMENT 2
DRAFT AGENDA

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PROPOSED AGENDA (PRELIMINARY)
PRESENTATION TO USEPA REGION III
TECHNICAL ASPECTS OF CONTAINMENT REMEDIES OF SOILS
CONTAMINATED WITH METALS:
CAPPING AND SOLIDIFICATION/STABILIZATION

Philadelphia, Pennsylvania
9:00 a.m. - December 13, 1994

1. INTRODUCTION (*Susan Fullerton, P.E., Parsons Engineering Science, Inc.*) - 5 minutes
 - Purpose of the Presentation
 - Introduction of the Group
2. BACKGROUND INFORMATION RELATED TO CONTAINMENT REMEDIES (*Susan K. Fullerton, P.E., and David B. Babcock, Parsons ES*) - 15 minutes
 - Superfund Reformation
 - Containment Remedies
 - Historical Usage at Superfund Sites
 - Projected Future Use/Changing Regulatory Image of Containment Remedies
 - Advantages/Disadvantages
3. SOLIDIFICATION/STABILIZATION (S/S) TECHNOLOGIES (*Paul Bishop, Ph.D, P.E., University of Cincinnati*) - 1 hour

Description of S/S Technology (Process Summary)

 - Historic Usage
 - *In situ* Applications
 - *Ex situ* Applications
 - Process Evaluation
 - Advantages/Limitations
 - Use as Innovative Technologies at Superfund Sites
 - "Hot Spot" Treatment
 - Reuse of S/S Material
 - Evaluation of S/S vs. USEPA Remedy Screening Criteria
 - Long-term Protection of Human Health and the Environment
4. CAPPING TECHNOLOGIES (*David E. Daniel, Ph.D., P.E., University of Texas*) - 1 hour
 - Basic Functions of Cover Systems
 - Environmental Factors Affecting Cover Design
 - Cover System Components/Design
 - Advantages/Limitations
 - Historic Usage
 - Evaluation of Cover System Usage vs. USEPA Remedy Selection Criteria
 - Long-term Protection of Human Health and the Environment
 - Effectiveness
 - Elimination of Pathway Completion
 - Long-term Effectiveness (cover system life, maintenance requirements)
5. SUMMARY (*Susan Fullerton*) - 10 minutes
6. QUESTIONS/COMMENTS